

WHAT IS CLAIMED IS:

1        1. A method of making a web of conductive filler, comprising the steps of:  
2            placing a web of core material onto an interior surface of a web of conductive  
3 layer material; and  
4            turning first and second edges of the conductive layer material upward, folding  
5 the first edge of the conductive layer material over the core material, and folding the  
6 second edge of the conductive layer material over the first edge of conductive layer  
7 material.

1        2. The method according to claim 1, further comprising the step of placing  
2 a web of adhesive layer material onto the interior surface of the web of conductive layer  
3 material.

1        3. The method according to claim 2 wherein said web of conductive layer  
2 includes a substantially non-conductive fiber impregnated with a conductive resin.

1        4. The method according to claim 1, further comprising the step of placing  
2 a web of adhesive layer material onto the exterior surface of the web of conductive layer  
3 material.

1        5. The method according to claim 1 wherein said web of conductive layer  
2 includes a substantially non-conductive fiber impregnated with a conductive resin.

1        6. A method for making a conductive filler material comprising the steps  
2 of:  
3            selecting a web of conductive layer material; said web of conductive  
4 layer material having an interior surface and an exterior surface;  
5            positioning a web of non-conducting core material onto said interior  
6 surface of said web of conductive layer material;

7                 folding said web of conductive layer material around said web of non-  
8 conducting core material, wherein said web of conductive layer material is  
9 completely wrapped around said web of non-conducting core material; and  
10                 pressing said web of non-conducting core material wrapped with said  
11 web of conductive layer material by passing through a pair of rollers to form said  
12 conductive filler.

1                 7.         The method according to claim 6, wherein said web of conductive layer  
2 material includes a substantially non-conductive fiber impregnated with a conductive  
3 resin.

1                 8.         The method according to claim 7, wherein said web of conductive layer  
2 material is folded around said web of non-conducting core material such that said  
3 web of conductive layer material overlaps itself on one side of said web of non-  
4 conducting core material, thereby forming a laminated layer of said web of  
5 conductive layer material.

1                 9.         The method according to claim 6, wherein said web of conductive layer  
2 material is folded around said web of non-conducting core material such that said  
3 web of conductive layer material overlaps itself on one side of said web of non-  
4 conducting core material, thereby forming a laminated layer of said web of  
5 conductive layer material.

1                 10.      A method for making a conductive filler material comprising the steps  
2 of:

3                 selecting a web of conductive material, said web of conductive material  
4 having an interior surface and an exterior surface, with said interior surface including  
5 a first edge and a second edge;

6                 selecting a first adhesive web;

7                 selecting a second adhesive web;

8                 positioning said first adhesive web on said first edge of said web of  
9 conductive material;

10                   positioning said second adhesive web on said second edge of said  
11  web of conductive material;  
12                  selecting a web of a non-conducting core material;  
13                  positioning said web of non-conducting core material onto said interior  
14  surface of said web of conductive material between said first and said second  
15  adhesive webs;  
16                  folding said web of conductive material with said first and said second  
17  adhesive webs thereon around said web of non-conducting core material, wherein  
18  said web of conductive material is completely wrapped around said web of non-  
19  conducting core material; and  
20                  pressing said said web of conductive material with said first and said  
21  second adhesive webs thereon folded around said web of non-conducting core  
22  material by passing through a pair of rollers to form said conductive filler.

1                 11. The method according to claim 10, wherein said web of conductive  
2  material includes a substantially non-conductive fiber impregnated with a conductive  
3  resin.

1                 12. The method according to claim 11, wherein said web of conductive  
2  material is folded around said web of non-conducting core such that said web of  
3  conductive material overlaps itself on one side of said web of non-conducting core  
4  material, and further wherein one of said first and said second adhesive webs is  
5  against a top surface of said web of non-conducting core material and the other of  
6  said first and said second adhesive webs is against said exterior surface of said web  
7  of conductive material, thereby forming a conductive filler having a laminated layer of  
8  said conductive material.

1                 13. The method for making a conductive filler material of claim 10, wherein  
2  said web of conductive material is folded around said web of non-conducting core  
3  such that said web of conductive material overlaps itself on one side of said web of  
4  non-conducting core, and further wherein one of said first and said second adhesive  
5  webs is against a top surface of said web of non-conducting core material and the

6 other of said first and said second adhesive webs is against said exterior surface of  
7 said web of conductive material, thereby forming a conductive filler having a  
8 laminated layer of said conductive material.

1           14. A method for making a conductive filler material comprising the steps  
2 of:

3           selecting a web of conductive material, said conductive material  
4 including a substantially non-conductive fiber impregnated with a conductive resin;  
5 said web of conductive material having an interior surface and an exterior surface;

6           selecting a first adhesive web having a first side and a second side,  
7 said first side of said first adhesive web covered by a first release liner,

8           selecting a second adhesive web having a first side and a second side,  
9 said first side of said second adhesive web covered by a second release liner;

10           positioning said first adhesive web covered by said first release liner on  
11 said first edge of said web of conductive material, wherein said second side of said  
12 first adhesive web is in contact with said interior surface of said web of conductive  
13 material;

14           positioning said second adhesive web covered by said second release  
15 liner on said second edge of said web of conductive material, wherein said second  
16 side of said second adhesive web is in contact with said interior surface of said web  
17 of conductive material;

18           pressing to secure said first adhesive web and said second adhesive  
19 web to said web of conductive material, wherein said pressing is done by passing  
20 said web of conductive material with said adhesive webs thereon through a first pair  
21 of rollers;

22           removing said first release liner from said first adhesive web;  
23           removing said second release liner from said second adhesive web;  
24           selecting a web of non-conducting core material including non-woven  
25 fibers impregnated with a resin;

26           positioning said web of non-conducting core material onto said interior  
27 surface of said web of conductive material between said first and said second  
28 adhesive webs;

29                 folding said web of conductive material with said first and said second  
30 adhesive webs thereon around said web of non-conducting core material at a  
31 forming station by upwardly bending or folding said web of conductive material; and  
32                 pressing said unfinished filler by passing said unfinished filler through  
33 said second pair of rollers, wherein sufficient pressure is applied by said pressing to  
34 secure said second side of said outer adhesive web to said center portion of said top  
35 surface of said unfinished filler, thereby forming said conductive filler;

1                 15. The method for making a conductive filler material of claim 14, wherein  
2         said web of conductive material is folded around said web of non-conducting core  
3         such that one of said first and said second adhesive webs is against a surface of  
4         said web of non-conducting core material and the other of said first and said second  
5         adhesive webs is against said exterior surface of said web of conductive material,  
6         said bending or folding forming a laminated layer of said web of conductive material,  
7         wherein said web of conductive material is completely wrapped around said web of  
8         non-conducting core material, thereby forming an unfinished filler having said  
9         laminated layer of said conductive material resulting in a conductive filler having said  
10      laminated layer of said conductive material.

1                 16. The method according to claim 14, further comprising the steps of:  
2         selecting an outer adhesive web having a first side and a second side,  
3         said first side of said outer adhesive web covered by an outer release liner; and  
4         directing said outer adhesive web with said outer release liner onto a  
5         center portion of said top surface of said unfinished filler, and then completing the  
6         step directing said unfinished filler toward said second pair of rollers.

1                 17. The method for making a conductive filler material of claim 15, wherein  
2         said web of conductive material is folded around said web of non-conducting core  
3         such that one of said first and said second adhesive webs is against a top surface of  
4         said web of non-conducting core material and the other of said first and said second  
5         adhesive webs is against said exterior surface of said web of conductive material,  
6         said bending or folding forming a laminated layer of said web of conductive material,

7 wherein said web of conductive material is completely wrapped around said web of  
8 non-conducting core material, thereby forming an unfinished filler with a top surface  
9 having with said laminated layer of said conductive material resulting in a conductive  
10 filler with a top surface having said laminated layer of said conductive material.

1           18. A method for making a conductive filler material comprising the steps  
2 of:

3           Feeding a web of conductive layer from a roll of said web of conductive  
4 layer at a first unwind station, said conductive layer including a substantially non-  
5 conductive fiber impregnated with a conductive resin; said web of conductive layer  
6 having an interior surface and an exterior surface, with said interior surface including  
7 a first edge and a second edge;

8           directing said web of conductive layer to a second unwind station  
9 having a first and a second roll of adhesive material, wherein said first roll of  
10 adhesive material includes a first adhesive web having a first side and a second  
11 side, said first side of said first adhesive web covered by a first release liner, and  
12 further wherein said second roll of adhesive material includes a second adhesive  
13 web having a first side and a second side, said first side of said second adhesive  
14 web covered by a second release liner;

15           unwinding and positioning said first adhesive web covered by said first  
16 release liner on said first edge of said web of conductive layer, wherein said second  
17 side of said first adhesive web is in contact with said interior surface of said web of  
18 conductive layer;

19           unwinding and positioning said second adhesive web covered by said  
20 second release liner on said second edge of said web of conductive layer, wherein  
21 said second side of said second adhesive web is in contact with said interior surface  
22 of said web of conductive layer;

23           directing said web of conductive layer with both said first adhesive web  
24 with said first release liner and said second adhesive web with said second release  
25 liner thereon toward a first pair of rollers;

26           pressing to secure said first adhesive web and said second adhesive  
27 web to said web of conductive layer, wherein said pressing is done by passing said

28 web of conductive layer with said adhesive webs thereon through said first pair of  
29 rollers;

30 removing said first release liner from said first adhesive web by using a  
31 first liner collector;

32 removing said second release liner from said second adhesive web by  
33 using one of said first liner collector and a second liner collector;

34 directing said web of conductive material with both said first and said  
35 second adhesive webs thereon to a third unwind station containing a roll of a web of  
36 a non-conducting core material, said web of non-conducting core material including  
37 non-woven fibers impregnated with a resin;

38 feeding and positioning said web of non-conducting core material onto  
39 said interior surface of said web of conductive layer between said first and said  
40 second adhesive webs;

41 directing said web of conductive material with both said first and said  
42 second adhesive webs thereon and also with said web of non-conducting core  
43 material thereon, to a forming station;

44 folding said web of conductive material with said first and said second  
45 adhesive webs thereon around said web of non-conducting core material by  
46 upwardly bending or folding said web of conductive material, wherein one of said  
47 first and said second adhesive webs is against a top surface of said web of non-  
48 conducting core material and the other of said first and said second adhesive webs  
49 is against said exterior surface of said web of conductive layer, said bending or  
50 folding forming a laminated layer of said web of conductive layer, wherein said web  
51 of conductive layer is completely wrapped around said web of non-conducting core  
52 material, thereby forming an unfinished filler with a top surface having said  
53 laminated layer of said conductive layer;

54 directing said unfinished filler toward a second pair of rollers; and  
55 pressing said unfinished filler by passing said unfinished filler through  
56 said second pair of rollers, wherein sufficient pressure is applied by said pressing to  
57 secure said second side of said outer adhesive web to said center portion of said top  
58 surface of said unfinished filler, thereby forming said conductive filler;

1           19. The method according to claim 18, further comprising the steps of:  
2                 before directing said unfinished filler toward said second pair of rollers,  
3     directing said unfinished filler material toward a fourth unwind station containing a  
4     third roll of adhesive material containing an outer adhesive web having a first side  
5     and a second side, said first side of said outer adhesive web covered by an outer  
6     release liner; and  
7                 unwinding and directing said outer adhesive web with said outer  
8     release liner onto a center portion of said top surface of said unfinished filler, and  
9     then completing the step directing said unfinished filler toward said second pair of  
10   rollers.

1           20. The method according to claim 19, further comprising the steps of:  
2                 directing said conductive filler toward a rewind station; and  
3                 winding said conductive filler onto a rewind roll using said rewind  
4     station, wherein said conductive filler can then be packaged and shipped to a  
5     destination.

1           21. A method for making a conductive bar comprising the steps of:  
2                 selecting a web of conductive material, said conductive material  
3     including a substantially non-conductive fiber impregnated with a conductive resin;  
4     said web of conductive material having an interior surface and an exterior surface,  
5     said interior surface including a first edge and a second edge;  
6                 selecting a first adhesive web having a first side and a second side,  
7     said first side of said first adhesive web covered by a first release liner;  
8                 selecting a second adhesive web having a first side and a second side, said  
9     first side of said second adhesive web covered by a second release liner;  
10                 positioning said first adhesive web covered by said first release liner on  
11     said first edge of said web of conductive material, wherein said second side of said  
12     first adhesive web is in contact with said interior surface of said web of conductive  
13     material;  
14                 positioning said second adhesive web covered by said second release  
15     liner on said second edge of said web of conductive material, wherein said second

16 side of said second adhesive web is in contact with said interior surface of said web  
17 of conductive material;  
18 pressing to secure said first adhesive web and said second adhesive  
19 web to said web of conductive material, wherein said pressing is done by passing  
20 said web of conductive material with said adhesive webs thereon through a first pair  
21 of rollers;  
22 removing said first release liner from said first adhesive web;  
23 removing said second release liner from said second adhesive web;  
24 selecting a web of a non-conducting core material, said web of non-  
25 conducting core material including non-woven fibers impregnated with a resin;  
26 positioning said web of non-conducting core material onto said interior  
27 surface of said web of conductive material between said first and said second  
28 adhesive webs;  
29 folding said web of conductive material with both said first and said  
30 second adhesive webs thereon around said web of non-conducting core material at  
31 a forming station by upwardly bending or folding said web of conductive material,  
32 wherein one of said first and said second adhesive webs is against a surface of said  
33 web of non-conducting core material and the other of said first and said second  
34 adhesive webs is against said exterior surface of said web of conductive material,  
35 said bending or folding forming a laminated layer of said web of conductive material,  
36 wherein said web of conductive material is completely wrapped around said web of  
37 non-conducting core material, thereby forming an unfinished filler having said  
38 laminated layer of said conductive material;  
39 selecting an outer adhesive web having a first side and a second side,  
40 said first side of said outer adhesive web covered by an outer release liner;  
41 directing said outer adhesive web with said outer release liner onto a  
42 center portion of said top surface of said unfinished filler;  
43 pressing said unfinished filler by passing said unfinished filler through a  
44 second pair of rollers, wherein sufficient pressure is applied by said pressing to  
45 secure said second side of said outer adhesive web to said center portion of said top  
46 surface of said unfinished filler, thereby forming said conductive filler;

47                    placing said conductive filler at a top and a bottom of a stack of  
48    windings;  
49                    wrapping an insulating groundwall around said conductive filler with  
50    said stack of windings; and  
51                    forming said conductive bar by sealing said insulating groundwall.

1                 22. A forming station for making a web of conductive filler, the conductive  
2    filler having a web of conductive material wrapped around a web of core  
3    material, comprising:

4                    a die having a U-shaped passageway through which the web of the  
5    conductive layer material and the web of core material are passed, the die turning  
6    first and second edges of the conductive layer material upward;  
7                    a first barrier, the first barrier folding the first edge of conductive layer  
8    material on top of the core material; and  
9                    a second barrier, the second barrier folding the second edge of  
10   conductive layer material on top of the core material.

1                 23. The forming station according to claim 22 wherein said web of  
2    conductive layer material includes a substantially non-conductive fiber impregnated  
3    with a conductive resin.